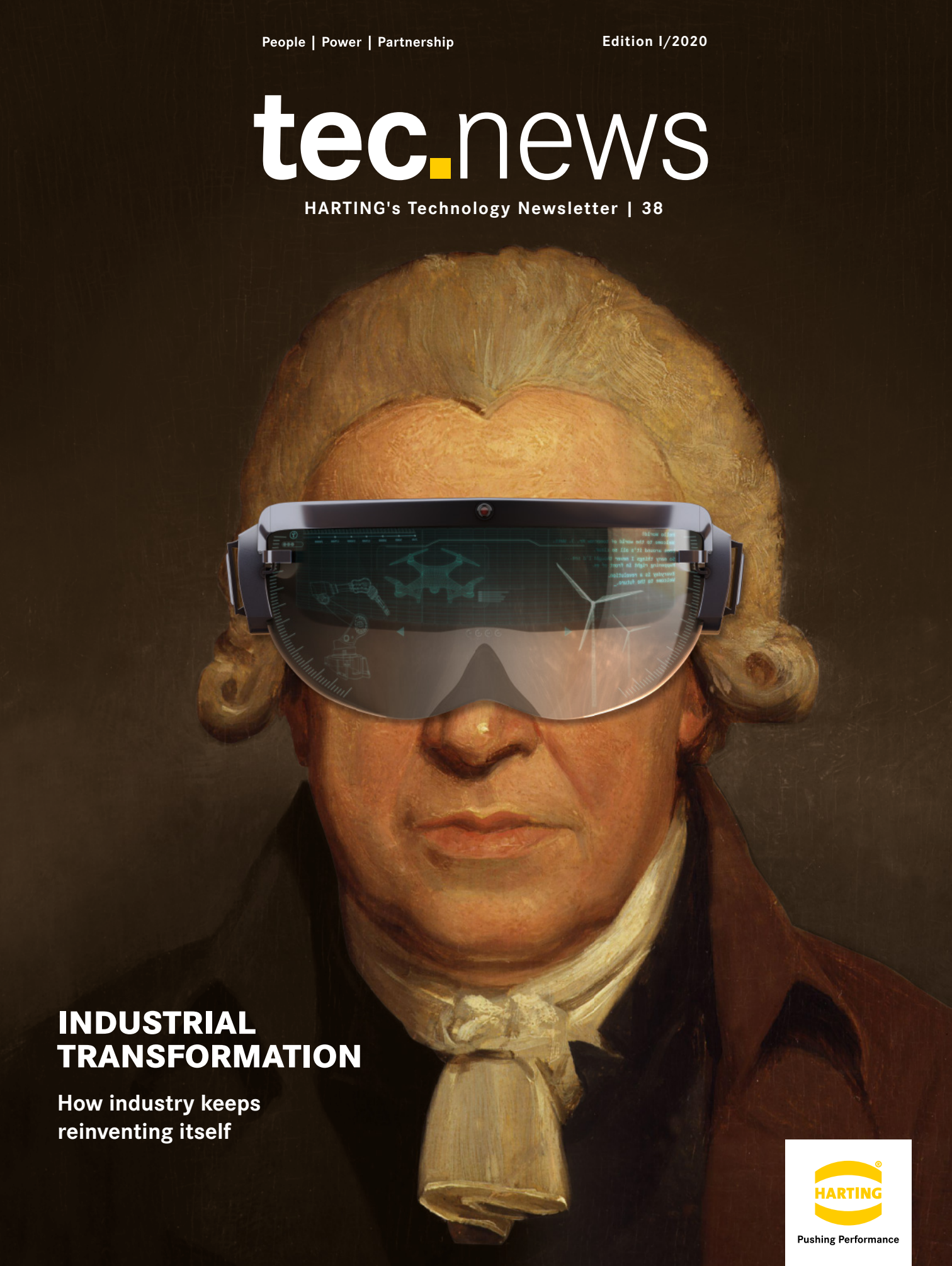
People | Power | Partnership

Edition I/2020

tec.news

HARTING's Technology Newsletter | 38



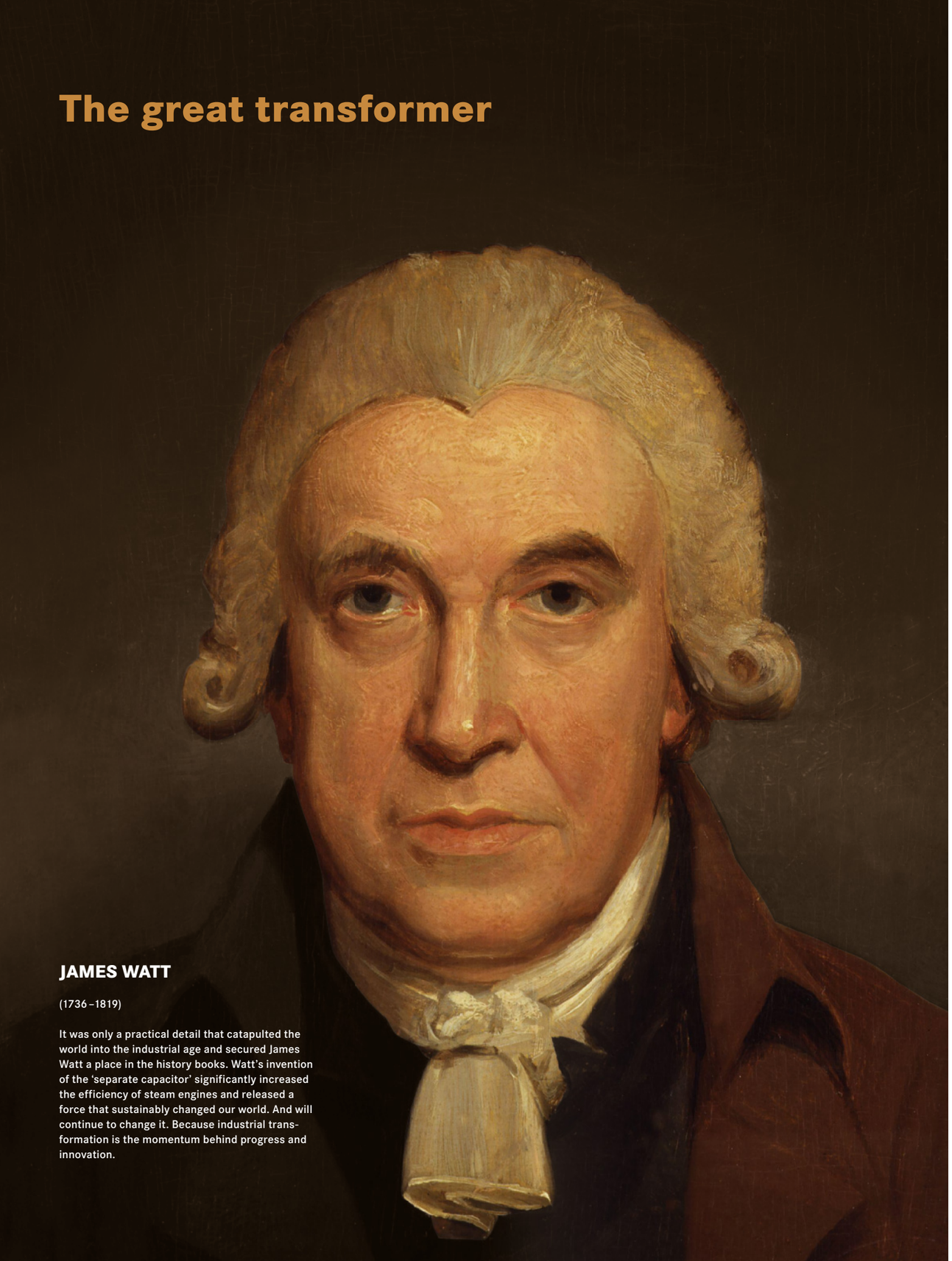
INDUSTRIAL TRANSFORMATION

How industry keeps reinventing itself

HARTING

Pushing Performance

The great transformer



JAMES WATT

(1736 – 1819)

It was only a practical detail that catapulted the world into the industrial age and secured James Watt a place in the history books. Watt's invention of the 'separate capacitor' significantly increased the efficiency of steam engines and released a force that sustainably changed our world. And will continue to change it. Because industrial transformation is the momentum behind progress and innovation.

The technologies
of the industrial transformation

Dear readers,

These days, we're experiencing the need to build industrial value-creation networks with new technologies in such a way that they become more sustainable and significantly more robust. In my opinion, this is the crucial direction in which the industrial transformation is headed.

Today, digital solutions are becoming ever more important. For HARTING, this is reason enough to meet this future head on by founding HARTING Digital Solutions and by making major corporate decisions in this context. Here's another fact: the ongoing industrial transformation is having a direct impact on the development of connectors – and here, too, we can draw on extensive, in-depth know-how in order to be prepared for this future.

We plan to consistently present the most engaging and exciting technologies to you on different platforms and channels so that you won't miss out on anything in the following weeks and months. You'll find some of them right here in this latest issue of our tec.news.

Here's wishing you enjoyable reading,

Philip Harting

Philip Harting,
Chairman of the Board

Technologies as the key to shaping the future

peraMIC Business Model
Focus on digital solutions

M12 system cabling
Time-saving and robust

Constant: change
75 years of HARTING Technology Group

CONTENT

STRATEGY

Prof. Dr. Martin Ruskowski,
Chairman of the board
of *SmartFactory*KL

SOLUTIONS

IN SHORT

TECHNOLOGIES AS THE KEY TO SHAPING THE FUTURE

The effects of megatrends and technologies on the industrial transformation of HARTING

HARTING is a global market leader in industrial connection technology for the three lifelines of data, signals and power. The industrial sector is undergoing a transformation. Digitisation has broken through the classic industrial automation pyramid's division into levels. In addition to the physical infrastructure, the Industrial Internet of Things (IIoT) has a data-based, digital image at all times. Lifelines can therefore no longer be thought of purely physically. Consequently, the market environment for automation technology, in machine and plant construction, in robotics and in the transportation sector has developed dynamically due to the IIoT's requirements. The future will be decisively shaped by long-term change - so-called megatrends will have a massive impact on the shape of industries, markets and society.

The HARTING Technology Group had already developed a vision in 1996 that serves as a guide today to the daily activities of the company and its employees. The key point of this vision is as follows:

> ***We want to shape the future with technologies for people.***

Given the fact that the industrial sector is undergoing a process of transformation, this vision is more relevant than ever. The changes known as megatrends are examples of the factors that will significantly shape our society and economy in the coming years. One example is the environmental reorientation of industry. This transformation has resulted in sustainability becoming the yardstick of all industrial production. The megatrends create a vision of the future from which a catalogue of questions is already emerging: How does a company prepare for these changes in order to be prepared for 2030 and beyond? What new technologies will these megatrends make possible?

In the next 10 years there will be a change from IP networks over to AI networks (AI = Artificial Intelligence). This will create the basis for establishing future technologies that are a specific answer to this impending change towards sustainable use of energy, for example. HARTING has a network that combines the technologies of the future to generate solutions for these megatrends in the industrial sector.

We use our own key technologies or enter into targeted partnerships to bundle expertises that create new solutions within our entire technology network. The primary goal for us is to develop solutions within larger contexts, such as through Ecosystems for e.g. Single Pair Ethernet. The SPE partner network was founded for this purpose. In order to achieve this common goal, we think in expanded partnerships (with universities, research institutions, technology experts, and professional associations), leverage our network in all directions and add the necessary key technologies.

Philip Harting,
Chairman of the Board

GOOD EXAMPLES ALREADY EXIST

With PerFact, the HARTING MICA becomes the ideal Edge Device for new services. The range of solutions for remote maintenance by PerFact is based on the hardware and software architecture of the MICA. This means that added value can be generated as an optimally coordinated overall system. The MICA as an Edge Device offers additional options, for example in the area of Predictive Maintenance.

We can also take a look at HARTING's SPE activities. In the area of connectivity, HARTING has built up an internationally standardised portfolio for Single Pair Ethernet. In cooperation with Perinet, a physical and digital infrastructure is created that integrates SPE technology into end devices and sensors. Other partners in the SPE network add further products and services, resulting in an efficient Ecosystem.

These examples illustrate HARTING's path into the future. Technologies become the key to this -- for us, real key technologies. ■

UPDATE INDUSTRIE 4.0: *PRODUCTION LEVEL 4*

Since 2014, the *SmartFactory* Kaiserslautern has been gaining hands-on experience with the construction of the world's first Industry 4.0 demonstrator. We have been intensively analysing what we have learned for several years now. In doing so, we factor in current scientific knowledge, new AI methods and increasing amounts of data, and do this in conjunction with the question of how to interpret this in a way that makes sense and how this can all be implemented profitably. Industry 4.0 is an agile vision for which we're now providing an update: *Production Level 4.*

Prof. Dr. Martin Ruskowski,
Chairman of the board
of *SmartFactory*KL

In our view, the future lies in a modular and agile production structure in which people, machines and software are understood as a single unit. Still, the sovereign entity and decision-maker is the working person, the worker on site. IT and machines are under his control and are there to support him.

WHY THIS TERM?

The '4' in *Production Level 4* refers to the continuation of Industry 4.0. We want to learn from the experience of recent years and further develop Industry 4.0. The '4' also refers to the 4th level of autonomous production, in which humans continue to play a role.

Production Level 4 smartFactory KL®

Industrie 4.0 | Level 4 autonomy

WHAT IS THE GOAL OF PRODUCTION LEVEL 4?

Production Level 4 refers to the increase in manufacturing robustness through the use of agile responsiveness to external influences, based on artificial intelligence methods. Our goal is to increase transparency via automated data processing for the employee so that he can understand machine-made decisions at all times. This allows him to change or optimise processes at will.

Production Level 4 assumes that machines are developed, built and programmed in such a way that they "know" - based on collected and analysed experience - how an optimal production step needs to be performed under the given circumstances and with a view to the product.

Machine networking enables easy communication between machines as well as with the product, the goal being to exchange information about the next manufacturing step. In addition, we see a higher level that recognises the overall system and keeps an overview of things.

The transparency of the work processes enables status queries at any time and explains the reasons for decisions. The aim is to record the mostly unstructured measurement and analysis data from machines and to aggregate them into an understandable form. We call this a semantic form.

WHAT DOES THE FUTURE LOOK LIKE?

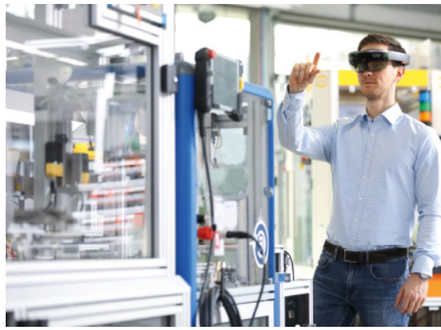
Flexible production only produces goods that have been ordered. In the future, it will be similar to an online marketplace. Smart machines are equipped with simple intelligence, they can offer their services and make decisions. They use AI techniques to e.g. check product quality directly within the production module or on an FTS. A higher-level system is used that tackles both big and small problems and in which bots, i.e. small software programs, handle the machine, the product and the logistics.

In the smart factory, the individual product autonomously finds its way through the manufacturing process. Batch size 1 guarantees resource conservation and market-adjusted production. The orchestrating overall system and the independent and autonomous work units are capable of learning and continuously optimise processes and their production methods. Keywords such as cooperativity, resource adaptation, self-learning, decision-making or explanatory skills become a matter of course.

WHAT ROLE DO PEOPLE PLAY?

At *Production Level 4*, we also see that fully automated production modules in the factory halls will gradually take over routine work and repetitive activities from people. However, robotics quickly reaches its limits in the field of mechanical activity, and hence the flexible adaptation of workplaces to new products demands human agility.

In the future, people will concentrate on their strengths in the factory: complex workflows, strategic decisions and, in particular, the pursuit of continuous improvement are all reserved for humans and their unique skills. Autonomy means that work units increase their (technical) versatility, are more flexible, communicate, and can make certain decisions independently. Humans always remain sovereign, bear responsibility, and can intervene at any time. ■



The **SmartFactory Kaiserslautern e.V. technology initiative** is part of the Innovative Factory Systems department at the DFKI. In addition, it is closely linked to the Chair for Machine Tools and Controls (WSKL) at the TU Kaiserslautern through Prof. Ruskowski. In addition to the employees of the *SmartFactory*KL, researchers and scientists from TU and DFKI also took part in the discussion on the development of *Production Level 4*. The special thing about the *SmartFactory*KL is precisely this interaction. The employees' research projects and doctoral theses develop new theoretical knowledge and fundamentals, and there is also regular reflection with the more than 50 members from the industrial sector. Theory and practice work together in the joint working groups and manifest themselves technically through the construction of the demonstrator.

PerFact Business Model

SOFTWARE SOLUTION PACKAGES FOR EFFICIENT MANUFACTURING

PerFact Innovation offers customisable modules for service and maintenance, logistics and process management

PerFact

Founded in 1998, Herford-based PerFact Innovation GmbH & Co. KG develops professional software solutions for service and maintenance, logistics and process management. Thanks to standardised yet customisable modules that can be used to supplement existing ERP systems in the area of machine service and logistics, the customer's work processes can be streamlined and overall effectiveness boosted - regardless of company size and industry.

Dr. Robert Rae,
CEO PerFact Innovation GmbH

In the longstanding partnership between the HARTING Technology Group and PerFact Innovation, the increasing importance of software for automation applications has seen the business-driven family expand its involvement with the PerFact group of companies since the end of 2019. Cloud platforms and Industry 4.0 strategies form the focus of the collaboration and thus the basis for holistic concepts for customers.

While hardware components and devices will always comprise a central component of the automation industry, software plays an increasingly important role.

The HARTING Technology Group focuses on connecting machines to the Internet through the MICA Edge Computing platform. The ideal partnership with PerFact Innovation has long evinced itself around the digital twin of the HARTING HAII4YOU Smart Factory, for example at the last few Hanover trade fairs: HARTING with hardware components and PerFact with software solutions to port all device data to the Cloud.

DIGITAL TWIN – INCREASING SERVICES AND MINIMISING COSTS

Remote service solutions for remote maintenance and service-related activities have long been established. The use of a virtual image – "digital twin" – of machinery installed worldwide is on the march. This facilitates service operations and creates new possibilities, for example for Condition Monitoring.

Servicing machines and systems installed worldwide is a highly relevant cost factor for machine manufacturers during the warranty phase. Every on-site visit by a technician that can be saved by using online access is worth cash in hand. Today, a virtual model of machines and systems can be created with reasonable effort. Such digital twins will in the future accompany the entire life cycle. Clear visualisations and new assistance systems with user-friendly user interfaces simplify access to machines installed worldwide, as well as experts' communication with machines installed at customer premises.
The HARTING MICA (Modular Industry Computing Architecture) enables access to machines and records machine data. Widely

differing solution expertise is brought together here: connecting machines with a wide variety of sensors, defining data interfaces, basic analysis functions, the visualisation of selected machine parameters, and secure external access to a machine. The entire process is documented and is centrally available as plant history - thanks to modular HARTING hardware and flexible, Linux-based open source software from PerFact that adapts to any challenge.

Information can be collected and processed immediately, worldwide and at any time. The resulting ability to perform remote machine maintenance, which can also be done using mobile smart devices, reduces throughput times and increases availability.

The cooperation forms the basis for the development of new holistic concepts for the customer.

Goods flows can be accelerated and made more transparent. Here, PerFact Innovation creates ideal solutions, products and support for different sectors and industries.

Operation via a secure, web-based platform simplifies expansion to additional user groups while simultaneously avoiding additional license costs. ■

“WE WANT TO SHAPE THE FUTURE WITH TECHNOLOGIES FOR PEOPLE.”

Extract from the HARTING corporate vision

peraMIC Business Model

FOCUS ON DIGITAL SOLUTIONS

The further entrenchment of digital solutions has resulted in re-establishing “peraMIC” as one of the main pillars of HARTING Digital Solutions. HARTING aggregates all activities under “Digital Solutions” in order to promote the partnership between the companies PerFact Innovations, Perinet, and peraMIC, and in order to strengthen the MICA.network. This clear focus on digital solutions and the resulting synergies strengthen HARTING's position as a provider of solutions and components for the digital transformation of the industrial sector.

PeraMIC’s autonomy guarantees even faster, more agile and flexible action, resulting in even stronger customer orientation. peraMIC is chiefly tasked with expanding the MICA modular edge computing system developed by HARTING, as well as with the development of special software and RFID solutions. There is close collaboration with the companies in the MICA.network to continue development of the MICA edge device - both in an organisational as well as commercial manner. MICA is the link between the field level and the Cloud and is intended to create solutions for remote maintenance, intralogistics and condition monitoring. The goal is to help customers position themselves as both future-proof and strongly competitive.

THE MICA.NETWORK IS A CENTRAL COMPONENT

The user community launched in 2016 – the MICA.network – is and remains a cornerstone. The network’s partners from Germany and abroad have set themselves the task of developing innovative concepts and solutions to digitise and network processes and objects. MICA is the central element for in-house applications and business models. Here, the focus is on pooling the skills of these partners and exchanging ideas with one another: presenting in-house expertise, learning from others, jointly mastering complex challenges and being open to new ideas – and, ultimately, to create better solutions. ■

Philip Harting,
Chairman of the Board

Application examples: peraMIC

With MICA (Modular Industry Computing Architecture), digitisation projects can be realised quickly and easily - directly on systems and machines.

Precise call-off control and re-procurement via eKanban:
The MICA-based RFID reader Ha-VIS RF-R300, when teamed up with the appropriate transponder technology and antennas as well as middleware integrated in the reader (GS1 ALE 1.1 standard), offers all the necessary components for building a simple and flexible eKanban Cloud solution. By joining forces with peraMIC and PerFact, customers can be offered an even more efficient, versatile and cost-effective solution. The added value produced through, for instance, real-time inventory reporting, efficient replenishment control and seamless ERP integration for SAP, etc. includes reliable replenishment, reduced inventory levels and increased productivity.

The advantage of cooperation with partners such as PerFact and others is that product development can be carried out even more effectively, and the entire system integration network worldwide benefits from it.

Condition Monitoring of robots
The company sionn.engineering relies on the MICA when manufacturing two new production lines in the food industry, with the MICA monitoring and transmitting the essential parameters of the robots that are deployed. Orders recorded in the ERP are transmitted to the MICA MySQL container. Based on the structure of the item data and order master data, process systems such as weighing and packaging technology are set up automatically. The Stäubli TX200L and RX160L industrial robots are equipped with automatic tool changing systems and adjust product palletisation based on picking parameters, and provide automatic notification when an order is complete. In addition, the MICA edge computing device processes all relevant process data and features a dashboard that provides production personnel with current identification data and order data, as well as fault diagnosis. ■

DEVELOPING AN OVERALL SOLUTION TOGETHER

The transformation of connectivity – 3 persons, 3 perspectives

Connectivity is undergoing upheaval, and today, more than ever, it needs to be considered more broadly. What does this transformation mean for HARTING's strategic positioning and for the company's operating environment? What is needed in order to be able to offer the market and customers an overall concept in the future? tec.news spoke to three leading experts, who presented their views from three different perspectives:

Frank Quast
Head of Product Management Installation Technology at HARTING, as Product Manager of a connector series that contain an increasing number of smart functions.

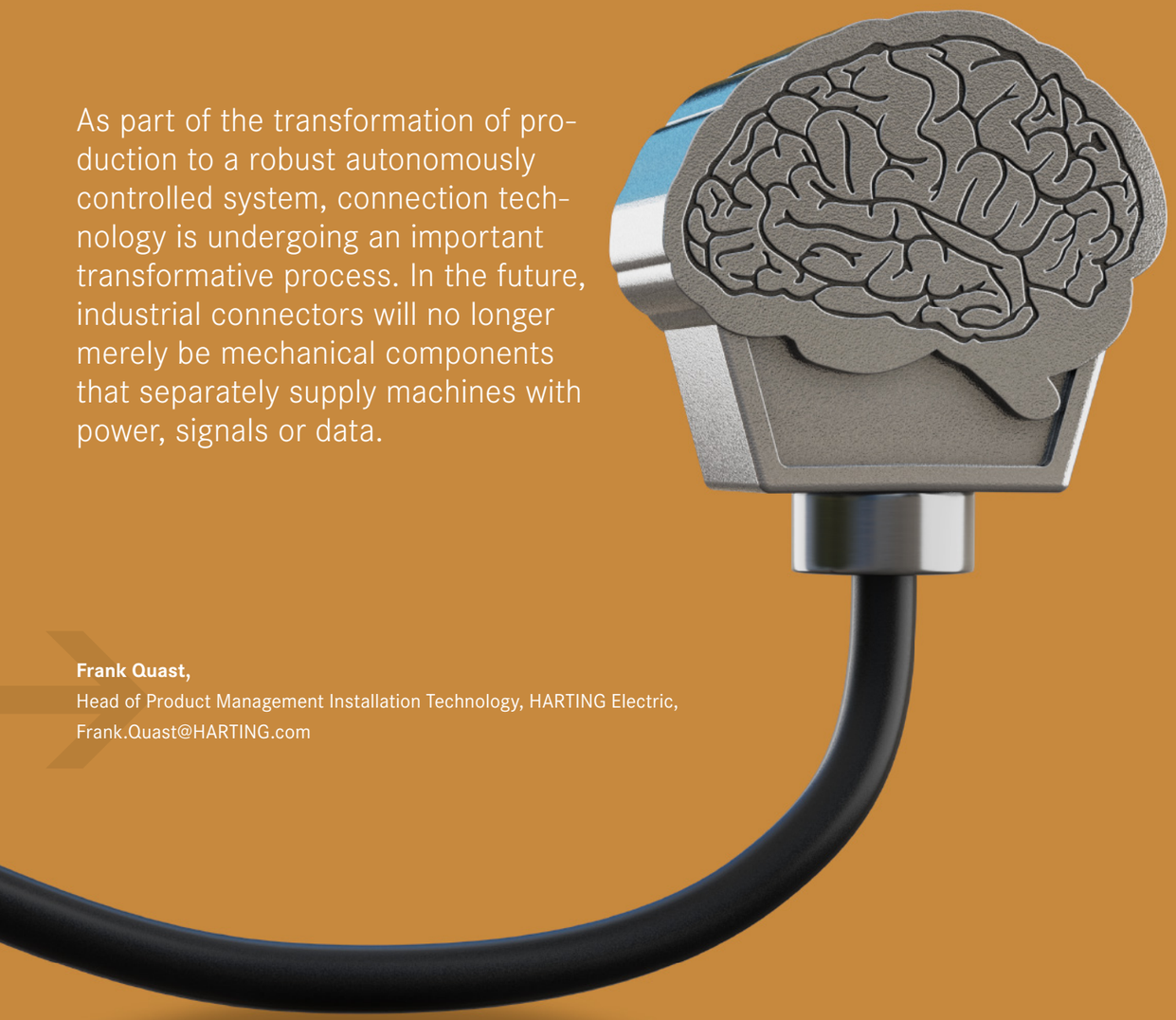
Dr. Karsten Walther
Managing Director of Perinet GmbH, who is showing what this type of end-to-end, IP-based networking can look like.

Andreas Huhmann
Board member at *SmartFactory*^{KL}, who describes the transformation in the sense of a general industrial change, with the keyword being 'autonomous production'.

Transformation of Connectivity

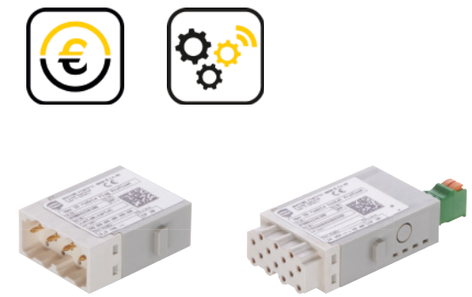
FROM THE MECHANICAL TO THE **SMART INTERFACE**

As part of the transformation of production to a robust autonomously controlled system, connection technology is undergoing an important transformative process. In the future, industrial connectors will no longer merely be mechanical components that separately supply machines with power, signals or data.

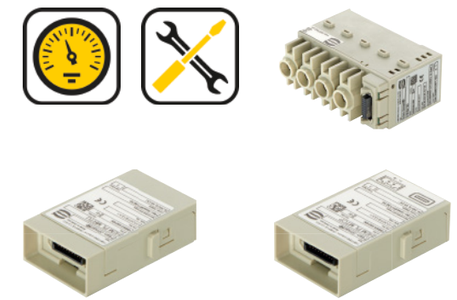


Frank Quast,
Head of Product Management Installation Technology, HARTING Electric,
Frank.Quast@HARTING.com

From the Han-Smart® family



Data storage and communication in the connector: Han® ID module



Current, voltage and energy measurement in the connector: Han-Smart® HEM module

Rather, they become active participants within the interaction of controls, sensors, actuators or other loads. The new generation of industrial interfaces not only enables passive communication, the interfaces themselves become communicative.

Over more than 75 years, HARTING has built up a comprehensive portfolio of passive connectors that meet all current industrial requirements for the transmission of power, signals and data. All the important interface transmission types have also been developed, including for electrical power and signals, FOC and compressed air.

Progress down the path towards the Smart Factory has seen further increases in the requirements that connectors in an industrial environment need to meet. Ever more diverse and active transmission options are required, e.g. for connecting sensors and actuators. Consequently, within the Han-Modular® series HARTING has enhanced the originally mechanical passive connectors with active functionality, with the goal being to build up an intelligent connector portfolio under the Han-Smart® line.

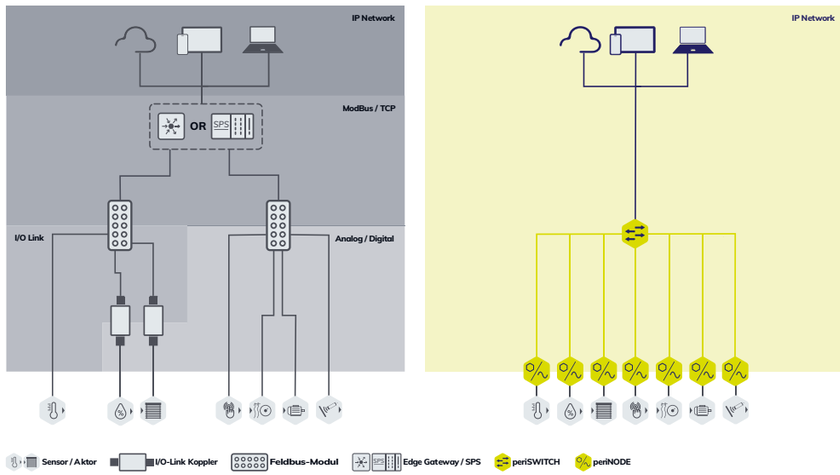
Progress down the path towards the Smart Factory has seen further increases in the requirements that connectors in an industrial environment need to meet.

The first step was the integration of analogue circuitry technology for the Han® SP module. The circuitry protects sensitive end devices in industrial environments from overvoltages and electromagnetic coupling, and provides this protection all the way from the site where the connection with the control cabinet is made.

The Han® ID module marks the entry of memory units and digital communication into the connector. The module records essential parameters used for the predictive maintenance of systems in the periphery, i.e. the year built, revision status and the duration of a component's use, maintaining the parameters in digital form for system control.

The latest product in the Han-Smart® series is the HEM module (HARTING Energy Measurement), which transmits the results of current and voltage measurements to fieldbus systems via integrated sensors. This module gives customers full transparency regarding energy consumption and enables them to easily identify potential ways to optimise their plants and systems. ■

END-TO-END IT-BASED **PRODUCTION**



The infiltration of IT-systems-based production is in full swing and is an important component in the implementation of autonomous controlling systems.

The applications in this area go beyond classic automation and are comprised of applications within the network, distributed from edge gateways to the Cloud. These applications require data from sensors and actuators. In terms of the IoT (Internet of Things), implementing end-to-end networking based on internet technologies is advantageous since it reduces effort and provides data security. Sensors and actuators simultaneously become networked, intelligent devices/computers that henceforth communicate via a medium (Ethernet) and no longer via signals.

HARTING is already showing what this type of end-to-end, IP-based networking can look like. For the *SmartFactory*KL HARTING implemented an intelligent production module that features, for example, a network-compatible, intelligent lockable connector as a module interface. HARTING also offers Single Pair Ethernet connectors and sockets as well as Single Pair Ethernet switches for the space-saving, inexpensive network-based connection of sensors and actuators. The corresponding sensor-side electronics are developed by HARTING "spin-off" Perinet, while the HARTING MICA is the appropriate platform for pre-processing data in the field. ■

HARTING is already showing what this type of end-to-end, IP-based networking can look like.

Dr. Karsten Walther,
CEO Perinet GmbH

THE MODULE INTERFACE OF *PRODUCTION LEVEL 4* PRODUCTION SYSTEMS

Production systems are becoming more flexible but also need to remain robust, i.e. simple and highly available. This can be achieved through autonomous processes. In the *SmartFactory*KL, we speak of "*Production Level 4*" to refer to extensive autonomy in production, the scenario in which people use their specific skills while intelligent processes relieve them of laborious tasks. We've leveraged the experience of our world-first Industry 4.0 production facility in the implementation of the new PL4 demonstrator. The facility's infrastructure was built up with HARTING industrial connectors to supply the production modules. .

Production Level 4 places significantly higher demands on a connector.

However, *Production Level 4* places significantly higher demands on a connector. These interfaces become intelligent, so that modules are integrated into the infrastructure at the right place and the module is connected to its lifeline at the right time. Unlocking takes place autonomously and depends on the condition of the production system. This ensures that the user is not put in danger by incorrectly unplugging the connector and that the production system's availability is optimised. Both of these are only possible if the connector is equipped with sensors, actuators and decentralised intelligence. Its active digital twin also permits the entire infrastructure to be managed. Thus, the classic connector is transformed into an intelligent module interface. HARTING will present a proposal for this module interface in the *Production Level 4* demonstrator. Since this is an interface for production infrastructure, an associated standardisation for the compatibility of different modules in the infrastructure is crucial for success. Consequently, both a *SmartFactory*KL project group and a DKE standardisation group are studying these future interfaces. ■

Andreas Huhmann,
Member of the Board *SmartFactory*KL

FROM HAWAII TO THE WHOLE WORLD

In the early 1970s, ALOHAnet, the world's first data network began in the Hawaiian Islands. At that time, few would have expected that it would one day be the basis of communication for international industrial production. Today, industrial production is no longer conceivable without Ethernet.

The requirements for data transmission in automation environments are steadily increasing and are quantitatively reflected in the number of installed Ethernet nodes. While BUS systems were predominant ten years ago, this relationship has now essentially reversed. Ethernet is the most commonly used communication standard in industrial plants - and the trend is gathering momentum. This makes reliable infrastructure comprised of interfaces and cabling all the more important. The HARTING Technology Group has been a pioneer of industrial Ethernet interfaces from the very beginning. We consistently go down this path in developing new and future-proof solutions, which are an indispensable building block in the infrastructure for IIoT.

In 1970, University of Honolulu professor Norman Abramson was looking for a cheap communication solution for the university's various locations on neighbouring islands. This first protocol, which fired data packets over two frequency bands at random in order to avoid collisions, comprised the basis for what would later become Ethernet. At the time, few people could imagine how this development, dubbed ALOHAnet, would change the world to this day.

The Internet is the basis of communication in industrial production.

The Internet has not only become a fundamental part of everyday life, it is also the basis of communication in industrial production. Production processes are rapidly becoming digitised, with more and more "smart devices" that have their own intelligence engrained into them. Ethernet made inroads into industrial manufacturing from top to bottom. The top of the well-known automation pyramid is illustrated by IT servers. In classical terms, the control level is illustrated below, with a subsequent connection to the field level via BUS systems. The industrial and IT world ultimately meld into one, with the keyword being I4.0 or IIoT.

This development is clearly reflected in the division of the market between newly installed BUSES versus Ethernet nodes. Ten years ago, BUS protocols were the predominant medium in industrial networks, while today this relationship has almost made a 180° turn, while the trend towards Ethernet continues to rise sharply.

ALWAYS THE RIGHT INTERFACE

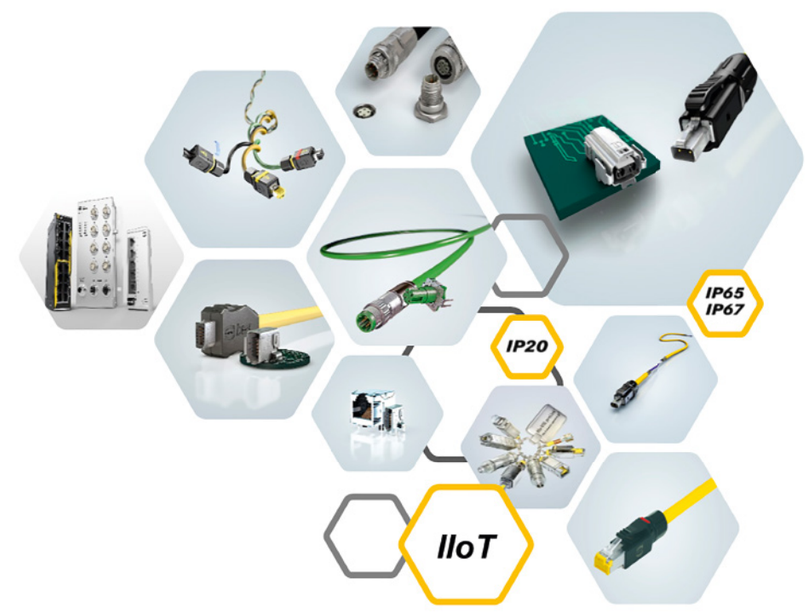
To ensure reliable networks in an industrial environment, robust and fail-safe infrastructure in the form of cables and connectors is required. HARTING recognised this need early on.

Today, the best-known and most widespread interface in the world for Ethernet is the RJ45, better known as the LAN (Local Area Network) connector in office environments. Originally designed for telecommunications and office applications, the RJ45 only had very limited usability in industrial applications. The normal RJ45 had little wherewithal to withstand shocks, vibration, electromagnetic influences, aggressive gases and liquids. However, since the RJ45 is still quite widespread, the logical consequence was a version optimised for industrial requirements. The result was dubbed the RJ Industrial®. Simple field assembly, combined with a break-proof protected locking clip and effective shielding make it a bestseller in automation to this day. Whether in IP20 or the protected IP65/67 PushPull version, the RJ Industrial means users always have the right interface for reliable Ethernet networks.

The trend towards ever smaller devices and component sizes does not stop with interfaces. Today, the RJ45 mating face is still a cheap and reliable interface, but in some devices it is simply too big. When the socket is the largest component in a modern industrial camera, things need to be readjusted.

HARTING is responding to this development with the miniaturised Ethernet ix Industrial® interface. The ix requires 70% less space in the device than RJ45 sockets while simultaneously significantly increasing transmission performance thanks to clever shielding and total robustness thanks to a metal lock. In order not only to put a proprietary solution on the market with this interface but to set a new standard for Ethernet in small applications, the ix Industrial® is standardised according to IEC 61076-3-124. This makes it an investment-secure interface for space-saving devices.

The trend towards ever smaller devices and component sizes does not stop with interfaces.



THE NEXT BIG STEP

The next milestone in the development of Ethernet in automation is the acronym SPE - Single Pair Ethernet. This denotes the transmission of Ethernet via just a single pair of copper wires and offers the necessary infrastructure for Ethernet to enter into the field level, making Ethernet a true example of implementation of the much-stressed buzzword 'IIoT'. Sensor actuator networks are connected directly to the Cloud in real time. HARTING's answer to this new transmission technology is the T1 Industrial. More on this at www.HARTING.com/T1-Industrial ■

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SINGLE PAIR ETHERNET INFRASTRUCTURE 2020 – AN OUTLOOK

January 23, 2020 - IEC 63171-6 is the first standard to describe a mating face for Single Pair Ethernet (SPE) in industrial applications. The standard goes hand in hand with the SPE cable standards per ISO/IEC 11801-x and the protocol standards according to IEEE802.3. The T1 Industrial Style interface is specified by the ISO/IEC and TIA bodies as the standard for SPE applications in the industrial sector. This sets the basis for the standardisation of SPE and no further change in the infrastructure will take place.

Matthias Fritsche,
Senior Specialist Ethernet, HARTING Electronics,
Matthias.Fritsche@HARTING.com

What sounds like standstill really means a final agreement on a cross-market standard for SPE infrastructure and thus for investment security on the user side. Next up is to build up an application-oriented portfolio based on IEC 63171-6.

On January 23, 2020, the IEC SC46B project group published the standard IEC 63171-6 (T1 Industrial Style). The standard is the first published connector standard that defines a connector face. This standard, initiated by HARTING in 2015, defines the mating face with all the necessary requirements, dimensions and test specifications. The cabling standards from ISO/IEC and TIA as well as SPE transmission standards for IEEE802.3 refer to IEC 63171-6.

Users looking to expand their Ethernet networks down to the field level in the future and who want a completely standardised and verifiable end-to-end connection cannot avoid the T1 Industrial interface. With the published IEC 63171-6, the basis for future IIoT networks has been finalised and will no longer change.

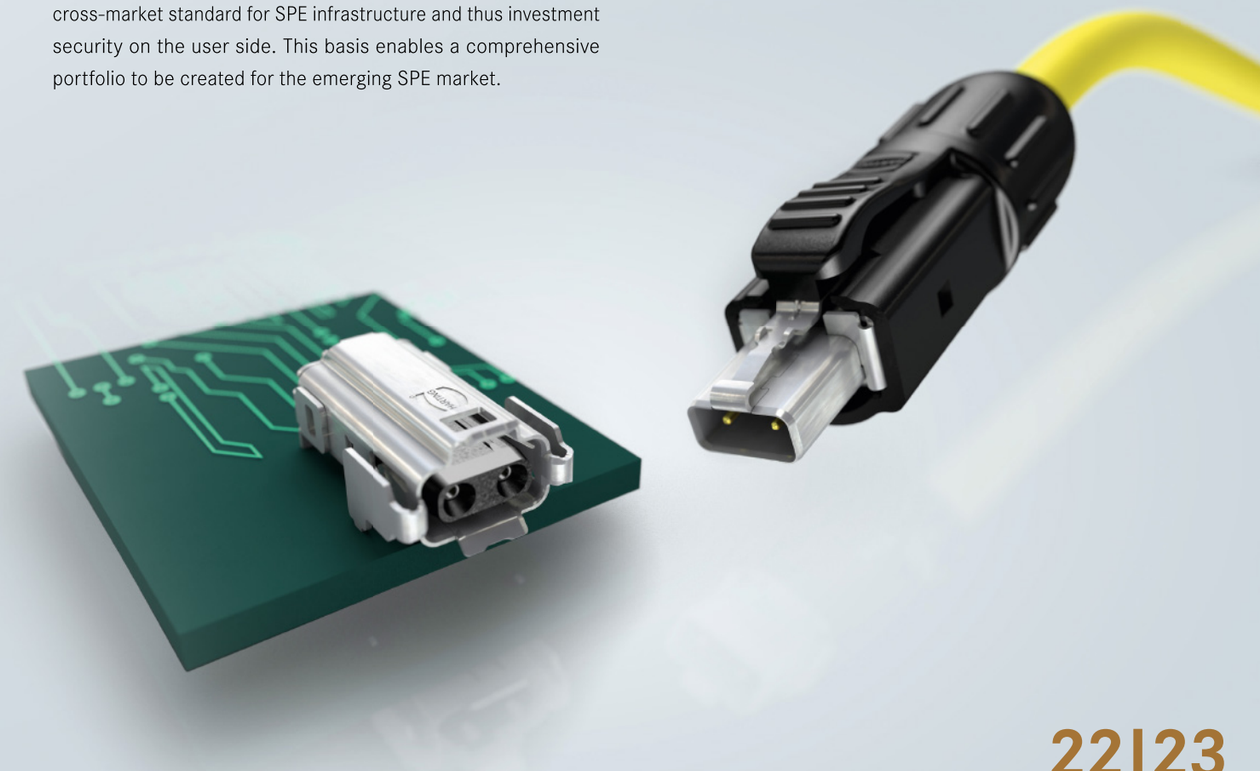
One might think that this means standstill, which is by no means the case since no further change means final agreement on a cross-market standard for SPE infrastructure and thus investment security on the user side. This basis enables a comprehensive portfolio to be created for the emerging SPE market.

At HARTING, the development of an extensive SPE portfolio has long since gotten underway, and from April on serial parts of various designs will be seen at the large automation trade fairs electronica and SPS.

This basis enables a comprehensive portfolio to be created for the emerging SPE market.

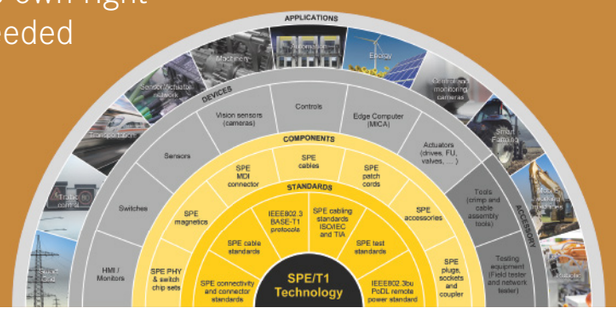
Starting in April these are series parts of the T1 Industrial IP20 variant in a field-assembly variant and as an overmoulded solution, as well as the corresponding device socket.

Later, in the autumn trade fair line-up, electronica in Munich and SPS in Nuremberg will showcase significantly more variants, e.g. IP65/67 variants in M12 housings, panel feed-throughs, IP65/67 PushPull variants as well as Power/Data Hybrid connectors in M8 housings. ■



THE **NETWORK GROWS**

The SPE Industrial Partner Network has more than doubled its member ranks within the space of a few months. The 7 founding members have now grown to 20 since the SPS trade show in November 2019. Each company is a technology leader in its own right and specialist in the various areas needed to strengthen and round out the SPE Ecosystem.



THE SPE INDUSTRIAL PARTNER NETWORK

SPE INDUSTRIAL PARTNER NETWORK

HARTING · TE · HRS · MURR ELEKTRONIK · WE WÜRTH ELEKTRONIK · softing · LEONI · molex · Amphenol ICC · igus · DEHN · HELUKABEL · LÜTZE · METZ CONNECT · Perinet · ESCHA · EKF · HIRSCHMANN · FLUKE networks · ZHAOLONG

COMMITTED TO IEC 63171-6

Jonas Diekmann, Technical Editor, HARTING Electronics,
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Frank Welzel, Head of Global Product Management, HARTING Electronics,
Frank.Welzel@HARTING.com

Since SPS 2019, the SPE Industrial Partner Network has more than doubled its member ranks. 20 well-known technology leaders from the automation industry were already part of the network as of March 2020. In addition to the founding members, following SPS 2019, the companies igus, DEHN, Helu Kabel, Molex, Amphenol, Lütze, ESCHA, Perinet, EKF System, Hirschmann Automation, Metz Connect, Fluke Networks and Zhaolong have all become members of the SPE Industrial Partner Network e.V. Other interesting companies have already expressed an interest and will soon see the network continue to grow. The strong interest and willingness of a wide variety of solution providers to become active and collaborate within a network demonstrates the relevance of Single Pair Ethernet for the future of automation. Together, all partners want to provide the building blocks for the SPE Ecosystem. They see themselves as partners for the Industrial Ethernet user groups, since SPE can provide a new infrastructure for these protocols such as PROFINET, thus enabling IP-based communication down to the field level. True to the claim: “SPE - the infrastructure for IIoT”.

The new members round out and strengthen the SPE Ecosystem and give interested parties the necessary expertise and investment security to start design-in projects with Single Pair Ethernet.
In order to be able to support these projects effectively, the SPE network is looking to establish direct contact and is offering a series of digital events in 2020. The members of the Partner Network will primarily serve up digital offerings such as webinars in order to offer you direct contact with them and provide a platform for dialogue on the topical area. The latest advances and developments are also slated to be shown. An ever growing number of design-in studies, prototypes and initial SPE devices are providing inspiration for in-house device development on the path to IIoT applications.

The new members round out and strengthen the SPE Ecosystem

Since the network was well-positioned right from the start in terms of infrastructure partners, the complete Ecosystem picture is currently materialising in big steps. In addition to cables and connectivity, partners are now on board that supply device-side magnetics and automation specialists have joined in and are providing support to the IEC 63171-6 interface as well. The most recent win was the addition of FLUKE Networks, an important partner for test equipment.

Don’t miss out on any digital activities at SPE in the digital 2020 trade fair fallback: follow our website www.single-pair-ethernet.de or follow our LinkedIN channel. https://shorturl.me/1bMP ■

SPE FOR SEAMLESS IP-BASED COMMUNICATION FROM THE SENSOR TO THE CLOUD

Sensor2Cloud applications depend on access to sensor data via an IP-based network. Translators or gateways are often necessary to integrate even simple sensors into an IP-based network. Single Pair Ethernet is now the missing link for seamless connectivity between sensors and the Cloud.

Application example filling level monitoring

Single Pair Ethernet (SPE) is a key technology for end-to-end connectivity between sensors and the Cloud or for IIoT applications in general. The idea is to use the same standardised protocols (IP-based) from the Cloud to the sensor and thus enable seamlessly networked communication. The great advantage of seamless network connectivity to a sensor/actuator is that computer-based OT applications that are located in the company/factory network guarantee direct access to these sensors and actuators. Thus, the part responsible for automation is not disturbed, and at the same time the OT application and the Sensor2Cloud application are not burdened with typical tasks for automation planning (planning in real time or displaying the process image). The result: the implementation of Sensor2Cloud applications requires much less effort than with traditional technologies based on automation.

APPLICATION EXAMPLES

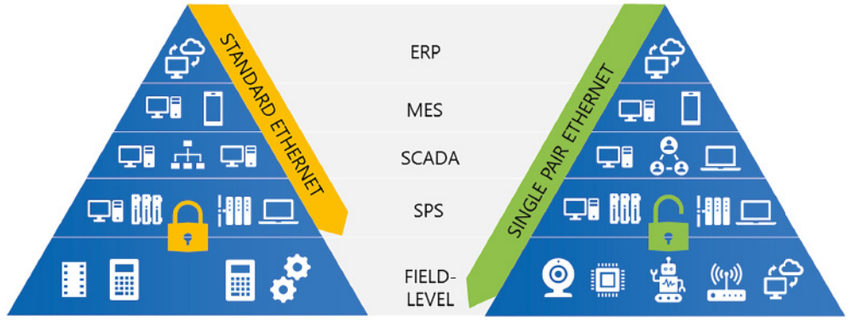
PerFact Innovation GmbH & Co. KG developed a distance sensor used in level monitoring for baking racks, with the sensor made network-compatible by means of an adapter. The passive sensor thus became an intelligent sensor that can report the fill level. Particularly advantageous is the fact that the higher-level software receives processed data and no longer needs to convert a sensor-dependent raw signal, for instance. Also, a mobile app can show the seller in the baking shop the fill level of the individual baking compartments in real time.

This happens because the sensor can identify itself and notify where it is installed (storage compartment). This drastically reduces planning effort (wiring). This self-identification is the basis for real Plug'n'Play and is generally enabled by established IT network technologies. Single Pair Ethernet in particular now also enables the practical wiring of individual sensors, which makes this paradigm shift from passive sensor to intelligent data provider possible. In the practical example of the baking rack, timely refilling is possible.

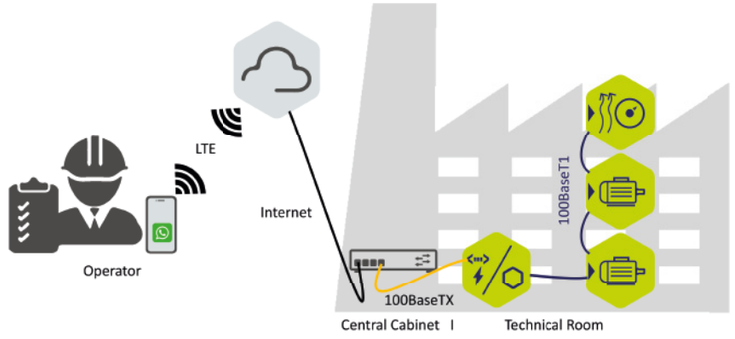
A similar example is the notification of building technicians on an industrial property that a malfunction has occurred. When a fault signalling contact is triggered, the signal is transmitted from a digital IO sensor via mqtt to an IoT platform that notifies the on-call technician via SMS, for example, and simultaneously creates a ticket in the operator's ERP system. A LAN network is available in most technical rooms. Alternatively, an LTE gateway can be used. The sensors are connected via a media converter (classic LAN to Single Pair Ethernet) with power supply, whereby only 1 converter is required per room and the sensors can be wired in a line thanks to multidrop. The installer only needs to configure the inventory number as an mqtt topic, under which the sensor then reports status changes. Thanks to a sensor's ability to self-identify, there is no need to create mapping tables or wiring diagrams. The technician can simply connect the fault signalling contacts, which saves significant effort. ■

Dr. Karsten Walther,
CEO Perinet GmbH

CONTINUITY UP TO THE FIELD LEVEL

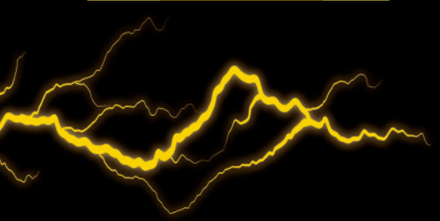


APPLICATION EXAMPLE FAULT MESSAGE CONTACT



SECURE PLUG-IN CONNECTIONS FOR MODULAR BATTERY STORAGE

The sustainable use of renewable energies such as wind or sun can only be achieved through energy storage modules, since these enable time-delayed, needs-based use. New Han® connectors make it easier to set up large arrays of battery storage modules.



Ingo Siebering,
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Ingo.Siebering@HARTING.com

With its Han® S series, HARTING offers secure connection technology for modular battery storage. The compact and flexible housings accommodate contacts for currents up to 200 A and 1500 V. The series' bulkhead housings can be flexibly rotated through 360 degrees even in mated condition, and the locking of hoods and housings, male and female contacts is intuitive. HARTING's use of the colour red for plus and black for minus, with additional mechanical coding, prevents the interfaces from being mixed up.

The use of connectors accelerates the build-up of energy storage modules using lithium-ion cells. The demand for such electricity storage is booming worldwide. According to the Federal Association for Energy Storage, for instance the German market has notched up high growth in recent years, particularly for home storage and industrial batteries. More and more industrial companies are securing an uninterruptible power supply with the help of storage modules, or making savings on energy costs by leveraging delayed load usage.

Since demand is increasing, providers of lithium-ion storage systems need to connect growing numbers of cells. The Han® S was specially designed to meet the need for simple, fast and safe contacting of cells for such systems. The new connector thus supports the assembly of battery storage modules in large quantities.

The Han® S offers users plug-in connections for storage modules while providing maximum safety, since the design meets all technical requirements like the UL 1973 e.g. and is based on the latest standard UL 4128 for stationary energy storage systems. The connector series thus corresponds to the highest standardisation level required internationally on the market.

The male contact for the battery module is designed to be finger safe and is equipped with a screw contour with an M8 thread. The contact can be installed on the battery module in a user-friendly manner with a socket spanner. The socket contact is crimped onto the cable and then inserted and screwed into the sleeve housing without tools. There is a red variant of the Han® S for the positive terminal and a black variant for the negative terminal. Both are also mechanically coded to prevent incorrect insertion.

These properties are also beneficial for service and maintenance. If a cell in an energy storage module shows a drop in performance, the respective management system can be used to switch it off and have it replaced. To do so, the Han® S interfaces of the adjacent modules are simply turned aside in the locked state to make room for the switch-out. No need exists to interrupt the energy storage functions of the unaffected modules.

The new connector thus supports the assembly of battery storage modules in large quantities.

A battery management module (BMS) is located in each modular storage module or storage cabinet. These units also need to be connected to form a control train. Here, the HARTING Han® S has added a bulkhead mounted housing with a busbar pin contact, once again in a red and black version. The system is managed via this train and the decentralised BMS transmit status messages to the higher-level system/plant control. ■

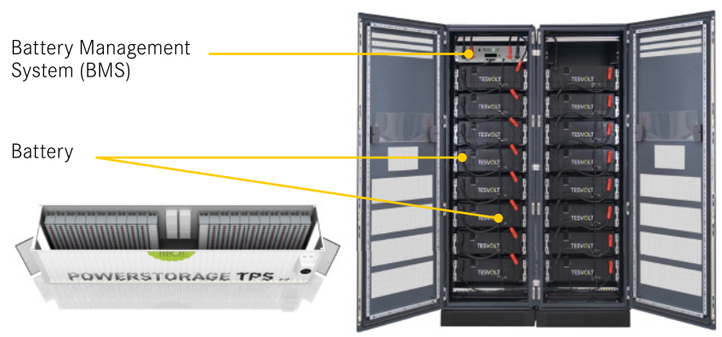
STANDARD COMPLIANCE:

Han® S is the first special high-current battery connector that meets the relevant UL and railway standards for stationary energy storage systems. Among others, it fulfils the requirements of UL 4128 for connectors in electrochemical battery system applications, UL 1973 for batteries in stationary applications, for emergency power supply for vehicles and in light rail applications, and UL 9540 for energy storage systems and accessories. Han® S is also shock and vibration proof according to the relevant railway standards.

HAN® S – APPLICATION

Battery Energy Storage System (BESS)

TESVOLT is the initial customer for the product



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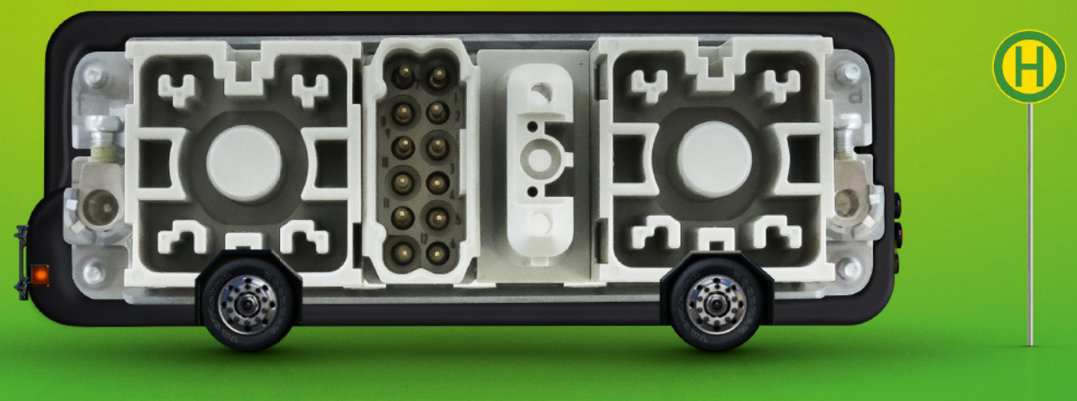
HARTING E-Bus interfaces

INFRASTRUCTURE FOR A **GREATER RANGE PER CHARGE**



Green mobility has become an important topic in both transport and environmental policy, as governments promote the use of zero-emission vehicles to reduce air pollution in metropolitan areas and meet their climate goals. As a result, electric buses are considered an effective means of moving away from the internal combustion engine to a zero-emissions drive. For a decade now, HARTING has been supporting the charging infrastructure by supplying electromobility connectors. Today, the product range extends far beyond efficient interfaces for electric vehicle charging infrastructure.

Christian Bohne,
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HARTING recognised the trend towards electric mobility early on. Since 2010, the manufacturer has been providing interfaces that meet IEC 62196 for charging infrastructure for battery-powered vehicles. Initially, the main challenge was to enforce standards. Infrastructure manufacturers, electricity providers and vehicle manufacturers had to agree on uniform specifications, data formats and mating faces. For Europe, a uniform system for charging stations (Type 2) has been in place since 2016. Since then, anything new that has been created for charging stations must use the connector faces Type 2 and CCS Type 2 ('Combo'), especially if the stations are open to the public.

HARTING has continuously expanded its e-mobility portfolio; it includes different types of AC charging plugs for Europe, the US and China. HARTING also offers solutions for combined AC/DC charging (Combo). In addition, HARTING has designed particular interfaces for use with so-called In-Cable Control and Protection Devices (IC-CPD).

CHARGING PROCESS FOR ELECTRIC BUSES

In principle, there are three charging methods for electric buses. In practice, transmission occurs predominantly by means of a pantograph or plug-in connector, and to a negligible extent by induction. Consequently, in addition to its plug-in connectors, HARTING also offers interfaces for charging via pantograph. This is a scissor-like extendable frame with charging contacts which dock onto a charging rail and transmit the power for the batteries. Depending on the customer's requirements, HARTING can offer a whole range of interface solutions for all aspects of the pantograph:

- Robust interfaces are required for the switching device of the pantograph, which is located on the roof of the e-bus. Depending on the required degree of protection, Han® A, Han B®, Han® HPR, Han® M or Han-Eco® are used.
- The 'inner workings' are formed by monoblock inserts or modules for data, signals and power.
- Power is routed to the battery storage via Han® HC contacts (up to 650 A and 4000 V).
- The new Han® S series connectors are recommended for wiring the battery storage modules.
- The entire range of HARTING PCB connectors are available for data and power transmission for devices and control units within the battery management system (e.g. *har*-flex®, *har*-flexicon® and various PCB adapters with a round connector face).

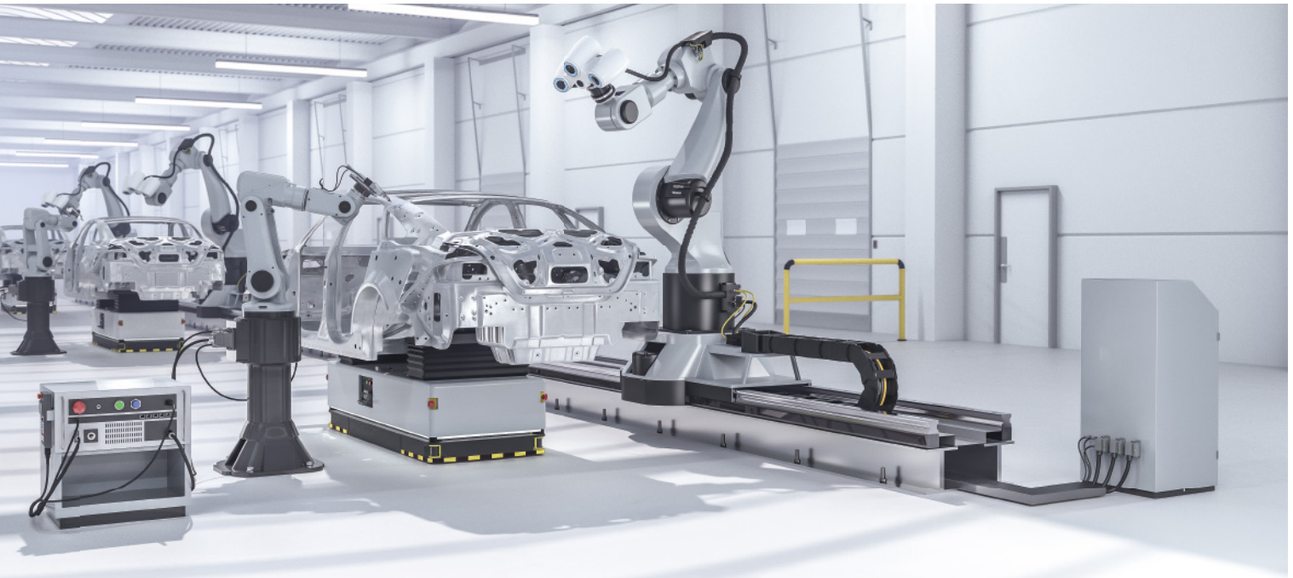
Adequate EMC shielding is also important in many e-bus applications. The closer a connection is to the pantograph, the higher the requirements for EMC. Here, HARTING can transfer significant know-how from the rail sector. Combinations that meet the high demands of the rail industry also work in the e-bus.

THE GOAL: BOOST POWER DENSITY

The trend in battery storage is towards higher power density, with the primary goal being to increase the range of vehicles. To do so, more electrical energy must be available in the same battery volume. For the interfaces, it follows that they must become more powerful without taking up more space. With the Han® S, HARTING has already presented a particularly flexible and space-saving solution up to 200 A. In the future, the goal will be to further increase maximum transferable power.

> *In the future, the goal will be to further increase maximum transferable power.*

This has consequences for the EMC properties of the interfaces. The higher the transmitted power, the higher the risk of interference in data lines. Solutions must be found that support the processing and assembly of storage systems in large quantities. In this regard, HARTING has already presented promising device connection technology, most recently the Han® 1A series that offers contact inserts with a shielding option. The series' housings are made of plastic and can be easily assembled and equipped with shielding elements. Such solutions promote both the flexible production of interfaces and the ability to rapidly assemble large quantities of connectors. ■



HARTING & Robotics

THE RIGHT INTERFACE FOR **ANY TYPE OF ROBOT**

The market for industrial robots has grown dynamically since 2013, on average by almost 20% annually. Automation and innovations in robotic technology are driving this growth. In the meantime, robots are widely used in industrial manufacturing, especially in the automotive, electrical engineering and mechanical engineering sectors. HARTING set standards at an early stage – especially in terms of interfaces between robots and control cabinets. Today, the manufacturer is offering solutions for virtually every type of robot.

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The first Han® interfaces for industrial robots were based on the demands made by the automotive industry. These included:

- good EMC behaviour / 360 degree shielding
- compact design, non-destructible surfaces
- easy handling with secure locking
- protection against welding sparks

HARTING has been developing solutions together with robot manufacturers that meet these requirements since the 1980s. One approach is to use separate connectors for power and signals to avoid interference. Alternatively, all three lifelines – data, power, signals – can be placed in one modular connector. Both concepts share the common goal of leveraging the advantages of connectors versus hard-wired connections in order to have quick and easy connections between robots and control cabinets.

The requirements for perfectly adapted and custom interfaces are just as varied as the diverse areas of application and types of robots.

Since the turn of the millennium, the demands on signal transmission in robotics have risen sharply since manufacturing systems have been equipped with more and more sensors. Ever more extensive Ethernet networks have also been set up for transmitting large amounts of data quickly to efficiently control these systems. HARTING is offering matching interfaces with RJ45 and M12 mating faces. Moreover, HARTING was the first supplier (with the Han-Modular®) to develop modular inserts that allow data connections to be placed side-by-side with power and signal contacts in one single connector.

Han®/HARTING solutions for robotics requirements

- Separate connectors: power connector plus signal interface and additional RJ45 or M12 data connectors
- Han-Modular®: combination of modules for power, signals and data transmission
- Combined connectors Han-Com®: multi-pole monoblocks for power and signals
- Han® 1A: compact plastic connectors in variants for signals, power or data
- *har*-port: data inserts USB, RJ45
- *har*-motion: DIN-connector-based power and signal supply up to 6 amps
- HARTING PushPull connector for data (RJ45), power (up to 16 A) or signals
- ix Industrial® in variants for signals and data/Ethernet

For some five years now, robot manufacturers have been subject to increasing cost pressure, which they counter by using the simplest possible interfaces and high contact density. A typical HARTING solution that accommodates this are the multi-pole monoblocks for Han D® and D-Sub contacts (Han DD®/Han® DDD/Han-Com®). These can accommodate up to 216 contacts for power and signals.

Compact, space saving robots are popular and their numbers are on the rise. This has prompted demands for more compact connectors. This miniaturisation trend is complemented by the requirement to transmit the highest possible data volumes. Both objectives limit each other.

Offering a wide product portfolio of PushPull series (with RJ45 data or power/signal inserts) and ix Industrial® connectors, as well as T1 for Single Pair Ethernet, HARTING is providing the ideal products for small robots. Robots are tools that can be installed and set up quickly and easily – and must be sufficiently robust for industrial use. In certain environments, this can be realised with the (lighter) PushPull V4 plastic enclosure. EMC, however, often plays a critical role in automobile production. Consequently, it can make more sense to use HARTING PushPull V14 for Ethernet, signals or power, in a metal enclosure. This is a solution that is more robust and, for instance, it can also withstand welding sparks.

Generally speaking, the ix Industrial® and T1 are highly interesting products for the miniaturisation of robots. Both connectors are standardised according to IEC 61076-3-124. There are already manufacturers in the industrial sector that no longer opt for the conventional RJ45 connectors and have replaced them with miniaturised variants.

Connectors consist of standard components, whereas the cables used can be highly complex. As a result, HARTING, as a connector specialist, together with its Customized Solutions subsidiary, is also offering cable harnesses for robotics. Here, HARTING is not only able to contribute its decades of experience with heavy-duty connectors – it can also point to the wide variety of its data interfaces, from light to rugged and robust variants. ■

OVERMOLDED M12 SYSTEM CABLING

WITH **TIME-SAVING PUSHPULL LOCKING MECHANISM**

Jonas Klein,
Global Product Manager, HARTING Customised Solutions,
Jonas.Klein@HARTING.com

M12 X-coded system cables with PushPull and screw locking.

Robust design and innovative PushPull locking technology also for overmolded system cables. Until now, M12 system cables are only available with Screw locking. The benefit of the time- and space-saving PushPull system were only available with our field-attachable M12 SlimDesign connectors.

Now, users can benefit from HARTING´s PushPull locking technology also with overmolded M12 system cables with A, D and X codings.

A simple snap-on of the connector

The conventional, time-consuming connection using a torque wrench is now history. HARTING´s PushPull locking mechanism only requires a simple snap-on of the connector, for example on a switch. A clearly audible “CLICK” confirms that locking is correct and secure. The strength of this connection technology fully come to the fore when space is limited. Users can rely on a solid connection between cable and the overmolded connector which is nearly not destroyable.

The pre-assembled system cables have been tested and certified for the entire industrial environment. IP protection, robustness and EMC safety all play a special role here. The requirements in the railway sector goes beyond this. Vibration resistance is a must have for applications in this harsh environment. The PushPull system also masters this challenge perfectly. ■

Conveying technology in the new logistics centre: The HARTING European Distribution Center

Motor connection cable with Han® connectors

Power cable with robust Han®-Compact plastic housing

FAST, UNCOMPLICATED AND SAFE – PRE-ASSEMBLED CABLING REDUCES INSTALLATION TIMES

Driven by online commerce, decentralised inventory management and changing expectations regarding the availability of products, the need for new storage and distribution centres is continuously developing. The right logistics concepts and building infrastructure aren't the only essential factor when planning and constructing new logistics centres. Optimising construction time and reducing installation effort also contribute significantly to the successful start of a logistics centre.

Matthias Wiehe,
Head of Global Project Engineering AMRT, HARTING Customised Solutions,
Matthias.Wiehe@HARTING.com

Modular conveyor technology enables installation times to be optimised while offering the necessary flexibility for project changes even after commissioning. Enlarging the logistics centre and expanding conveyor systems does not require a fundamental rebuild of the infrastructure.

Advancing **digitisation and modularisation** is resulting in an ever stronger trend towards decentralised drive technology. Decentralised drive concepts offer numerous advantages, particularly in logistic systems and in modular or even mobile systems. As quick and easy commissioning plays a crucial role. Modular cabling designs are an ideal complement for connecting devices to the supply of energy, data and signals.

No fundamental rebuild of the infrastructure required.

HARTING offers optimal connection technology, also beyond the well known connectors. The company goes one step further to minimise installation effort. Reduction of installation time is simplified significantly thanks to pre-assembled cables that are tailored to customer requirements, optimally adapted to modular conveyor technology and in line with environmental conditions indepently which drive brand is used. **Fast, uncomplicated and safe.**

In the area of power supply and power distribution, the Han-Compact® connector in particular is virtually used as a standard, and is deployed both as an EMC version with metal housings and shielded cables as well as in a robust plastic version. Depending on the application, for motor cabling the tried-and-tested Han® connectors come into play in various sizes and different conductor cross-sections. The use of pre-assembled cables enables manufacturers of modular conveyor technology to completely enrich the mechanical construction with all electrical wiring. Which in the end can be fully tested at manufacturing side and offers a "plug'n'play"-functionality on site for the modular conveyor element.

The topic isn't limited to the power cabling. In addition, HARTING offers a wide range for sensors and actuator cables. Here, customers can fall back on a wide portfolio of pre-assembled M8 or M12 cables in various codings and configurations. ■

BOOSTING VALUE CREATION

VIA DIGITAL PRODUCT DATA

A connector needs a digital twin, too

HARTING provides customers with application-related data packages for its products that can be integrated into mechanical or electrical design software. The packages are tailored to the needs of customers. By using the manufacturer's data, they can free highly qualified employees from performing routine tasks such as preparing parts lists or creating master data.

Timo Poggemöller,
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In order to advance the digitisation of their development processes, for example, mechanical engineers require the data for the components they use. This enables them to build digital twins for their machines. Digital twins are virtual images that accompany the product from development through production to commissioning and condition monitoring. Building such images requires the data that completely and correctly describes the components that are used and that comply with industry-standard formats and standards.

HARTING provides precisely such data packages for its connectors. The packages are prepared for design practice and can be seamlessly integrated into the customer's development systems. Users can use them to create digital twins of industrial connectors which then become an active component in the engineering of the overall product.

The virtual image offers mechanical engineers considerable advantages, since the functionality and effectiveness of new developments can be simulated in advance. Users can save time and money on complex test series. Digital twins are also helpful following commissioning and in the subsequent life cycle of machines. When compared with real process data and sensor data, they make it possible to record and evaluate actual operating states, e.g. in order to plan service calls.

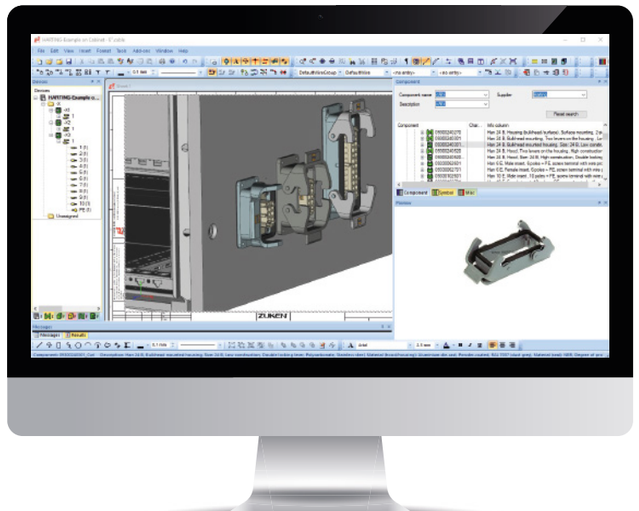
Seamlessly transfer interface data to your own development environment.

Creating a digital twin requires a good foundation of master data and development data. This is where the component manufacturers come into play since they can provide the data for each individual component of a machine – and thus provide the basis for building higher-level virtual systems.

The digitisation of information is a means to an end here. It helps the component manufacturer and customer efficiently organise cooperation across the product life cycle of a machine. HARTING's goal is to optimally support its customers right from the development process onwards. As a result, it provides its data consolidated in the formats that are processed by common development systems. These formats can be read directly into your own development environment including e.g. MCAD (***M**echanical **C**omputer-**A**ided **D**esign)* or ECAD (***E**lectronic **C**omputer-**A**ided **D**esign)* software, with no conversion required.

In addition to accuracy and readability, good data quality requires that the content can be found by the system in the right place and be used in the right moment in the production process. Thus, the configurator is the central HARTING instrument for generating and making available data sets for industrial interfaces. The user can design the right connector for his application in the system - and then download a complete data package for integration into higher-level systems.

By automatically providing the design data of used components with this tool, mechanical engineering development departments can increase their efficiency by eliminating the need for time-consuming collection or manual creation of product data. Highly qualified employees gain time to concentrate on value-adding development activities. ■



Interfaces on a E3 surface

CONSTANT: CHANGE

How a company has been reinventing itself for 75 years

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Manager Media & Publications,
HARTING Stiftung & Co. KG,
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September, 1945. Wilhelm and Marie Harting found the company "Wilhelm Harting Mechanische Werkstätten" in Minden in East Westphalia. The repair workshop measures just under 100 square meters, where, together with 10 other employees, they begin manufacturing devices for everyday needs – e.g. energy-saving lamps, hotplates, irons and pasture fences.

Orders increase in size and scope over the years. The company chalks up steady growth and consistently expands its product range. HARTING begins producing the Han® connector in the mid-1950s – Han stands for "HARTING standard".

Work on the design had already been ongoing several years earlier. The intent was to produce a connector that was robust, easy to handle and that could be used for a variety of purposes. The connector's exceptional quality sees the HARTING brand become well-known in over 70 countries. Since then, the product range has been continuously expanded and built out for additional requirements. Today, Han® connectors are as much a household name in the area of connectors as Kleenex tissues are in their own right.

Following the birth of the Han®, the product range was expanded to include record players and portable turntables. In 1959, HARTING was the first European company to start producing electronic cigarette vending machines. Following several years of successful production, the record player product range was discontinued in 1961. The production of jukeboxes ended in 1975, with the following years seeing the company primarily focus on cigarette vending machines and connectors.

> *The needs of customers have been decisive in the Transformation.*

Since then, the market environment for automation technology, mechanical and plant engineering, robotics and transportation has developed dynamically thanks to the requirements of the IIoT (Industrial Internet of Things). The HARTING Technology Group has solved this challenge in constructive fashion together with customers and partners in recent years, e.g. with the MICA Edge computing system, which was developed together with network partners and customers to create an open platform for implementing digitisation projects in the areas of Predictive Maintenance and Condition Monitoring.

THE FUTURE MEANS PERMANENT CHANGE

The needs of customers have been decisive in the transformation that the HARTING Technology Group has undergone over the past seven and a half decades. The company supports its customers as a consultant, service provider and system supplier. Simply responding to existing requirements is typically not enough – thinking ahead and anticipating customer requirements are also necessary. In the age of Industry 4.0, IIoT and digitising processes, HARTING sees itself as a driving force behind industrial transformation. ■

POWER, DATA AND SIGNALS FOR THE **“metroSNAP”**

Swiss automobile manufacturer Rinspeed is once again relying on innovative HARTING technology for its new “metroSNAP” concept vehicle. This time, the technology group delivers a specially designed interface. The HARTING module assists the driver in using the vehicle quickly and flexibly for a broad variety of tasks. The “metroSNAP” consists of two elements. On the one hand, there is the Skateboard that serves as an optimised electric vehicle, and on the other there is the “Pod”, which can be switched out in flexible manner to accommodate different tasks. Communication, signal transmission and power supply must all work smoothly between these two elements.

The HARTING interface supplies Power, Data and Signals for the “metroSNAP”.

The Rinspeed “metroSNAP”: whether passenger transport or freight logistics – the vehicle boasts a wide range of uses.

READ AND **WIN!**

Solve our puzzle and send the missing word to tecnews@HARTING.com

Classic Ethernet connector				R			5			
World's first wireless computer network	A			H				t		
Place of foundation of HARTING						I				N
Single Pair Ethernet				P						
Rinspeed concept car			r	o		N				

Dear Reader, we would like to thank you for your interest in our tec.news by entering you in a raffle. All you have to do is send usthe missing word from our puzzle and you'll be automatically be entered in the draw to win a Samsung Gear Fit 2 fitness strap. The closing date for entries is 31 July 2020. Here's wishing you good luck,

Your tec.news editorial team

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HARTING **TRADE SHOW CALENDAR***

2020-05-13 – 2020-05-15	China, Beijing	Industrial Automation Beijing
2020-08-03 – 2020-08-06	China, Shanghai	Chinaplas
2020-05-27 – 2020-05-29	Japan, Tokyo	JECA Fair - Electrical Construction Equipment and Materials Fair
2020-05-27 – 2020-05-28	China, Shanghai	Rail & Metro Shanghai
2020-06-01 – 2020-06-04	USA, Denver	AWEA Windpower
2020-06-24 – 2020-06-27	Thailand, Bangkok	Manufacturing Expo
2020-05-13 – 2020-05-15	China, Shanghai	CIROS - China International Robot Show
2020-09-14 – 2020-09-19	USA, Chicago	IMTS 2020
2020-09-15 – 2020-09-19	China, Shanghai	IAS - Industrial Automation Show Shanghai 2020
2020-09-22 – 2020-09-25	Germany, Berlin	Innotrans
2020-09-28 – 2020-09-30	Italy, Parma	SPS IPC Drives Italia
2020-10-05 – 2020-10-09	Czech Republic, Brno	MSV Brno 2020
2020-11-10 – 2020-11-14	Taiwan, Taichung	TMTS
2020-11-10 – 2020-11-13	Germany, Munich	electronica
2020-11-26 – 2020-11-28	Germany, Nuremberg	SPS IPC Drives 2020

* All details are based on the official statements of the relevant trade fairs at the time of printing.

PUBLICATION DETAILS

Published by: HARTING Stiftung & Co. KG, M. Harting, P.O. Box 11 33, D-32325 Espelkamp (Germany), Phone +49 5772 47-0, Fax +49 5772 47-400, **Internet:** http://www.HARTING.com

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Design and Layout: Dievision Agentur für Kommunikation GmbH

Production and printing: M&E Druckhaus, Belm

Circulation: 10.000 copies worldwide (German, English and 12 additional languages)

Source: If you are interested in obtaining this newsletter on a regular basis, free of charge, contact your nearest HARTING branch, your HARTING sales partner or one of the local HARTING distributors. You can also order tec.News online at www.HARTING.com.

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